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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,867	12/31/2001	Ralph Sigling	GR99P3438	4654

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EXAMINER	
DUONG, THANH P	

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/035,867	SIGLING, RALPH	
	Examiner	Art Unit	
	Tom P Duong	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/31/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1-2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 2, the recitation of "wherein said mixer is a first mixer, and wherein a second mixer" is indefinite and inaccurate. It is not clear how a single mixer represents both a first mixer and a second mixer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Publication Number 10151324 (JP '324) in view of Herr et al. (6,086,241). Regarding claims 1, 5-6 and 8, JP '324 discloses a device for cleaning flue gas (Fig. 1), comprising: a flue gas passage (1) for conducting flue gas in a given flow direction; an apparatus (ammonia injection part 4) for injecting an additive adapted to release a reducing agent (ammonia) in said flue gas passage; a catalytic converter (catalyst bed

3) for reducing nitrogen oxides disposed in said flue gas passage; one or more static mixers 8 installed between each successive catalyst bed 3 (Section 0011); and a rectifier (straightening vane 7) installed upstream of catalyst bed 3. JP '324 fails to disclose a mixer for rendering a mixing of the flue gas with the reducing agent more uniform disposed downstream of said catalytic converter in the given flow direction. Herr '241 teaches it is conventional to provide mixing unit 3 in a bend conduit region (Fig. 3) downstream (Abstract) of a catalytic bed (Col. 4, lines 4-8) to facilitate mixing of the flue gas with the reducing agent (Col. 2, lines 28-34). Thus, it would have been obvious in view of Herr to one having ordinary skill in the art to modify the apparatus of JP '324 with a mixer as taught by Herr in order to facilitate mixing of the flue gas with the reducing agent. Regarding claims 2 and 4, JP '324 discloses a rectifier (straightening vane 7) disposed between the injection part 4 and catalyst bed 3 but fails to disclose a first mixer and a second mixer disposed in the flue gas passage. Herr further teaches guide configuration including mixing means upstream and downstream near a bend location (Col. 1, lines 6-8 and Col. 2, lines 51-61) to facilitate mixing of the gases. Thus, it would have been obvious in view of Herr to one having ordinary skill in the art to provide a first mixer upstream and a second mixer downstream near a bend location to facilitate mixing of the gases. Regarding claim 3, JP '324 in view of Herr discloses the second mixer and first flow rectifier as described in claim 2, above and Herr further teaches the diverter apparatus (Fig. 3, guide vane 32) to facilitate directing the flow of the flue gas around the bend location 26 in order to minimize pressure drop in the flue gas conduit. Thus, it would have been obvious in view of Herr to one having

ordinary skill in the art to modify the device of JP '324 with diverter apparatus as taught by Herr in order to facilitate directing the flow of the flue gas around the bend location. Regarding claim 7, JP '324 discloses a straightening vane 7 or grid rectifier. For purpose of argument, if straightening vane is not a grid type rectifier, then it would have been obvious to modify the rectifier of JP '324 with a conventional grid type rectifier to prevent stagnating and swirling of the flue gas (See USPN 5,043,146).

3. Claims 9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (JP '324 in view of Herr '241) as applied to claim 1 above, and further in view of Huber (3,785,620). Regarding claims 9 and 11-12, the applied references discloses a mixer of the claimed invention but fails to disclose a specific type of mixer comprises of a plurality of immovable lamellae, disposed obliquely with respect to a flue gas flow. Huber teaches a mixing apparatus comprises of a plurality of lamellas disposed at an angle relative to the direction of the media flow. The use of such mixing apparatus allows the gases (Col. 2, lines 1-2) to be uniformly mixed together in a relatively short length (Col. 1, lines 32-34). Thus, it would have been obvious in view of one having ordinary skill in the art to modify the apparatus of the applied references with mixer of lamella type to allow the gases to be uniformly mixed together. With respect to the mixer having wider lamellae disposed upstream and downstream of a catalyst converter than mixers assigned to the catalytic converter, it would have been obvious in view of the applied references to provide a wider lamellae for mixers upstream and downstream of the catalytic converter to minimize press drop

increase across the flue gas conduit and narrow lamellae mixers in the catalyst bed to facilitate the conversion or reduction of NOx in the flue gas stream. In addition, Applicant has not disclosed advantages and/or unexpected results for having a wider lamella mixer in the upstream and downstream versus narrow lamella mixer in the catalytic converter. Thus, it would have been obvious in view of the applied references to one having ordinary skill in the art that the mixers of the applied references provide the same performance as the mixers of the claimed invention.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (JP '324 in view of Herr '241) as applied to claim 1 above, and further in view of MacInnis (5,437,851) and Kuroda et al. (5,078,973). The applied references discloses the mixer downstream of the catalytic converter but fails to disclose an air preheater connected downstream of converter and heated by the flue gas. MacInnis teaches an air preheater is disposed downstream of a selective catalytic reduction (SCR) reactor as shown on Figure 1 to preheat the combustion air. Likewise, Kuroda teaches an air preheater (air heater 18) is disposed downstream of the treated flue gas to recover the heat for the combustion air to the boiler (Col. 5, lines 34-39). Thus, it would have been obvious in view of MacInnis and Kuroda to one having ordinary skill in the art to modify the apparatus of the applied references with either an air preheater as taught by MacInnis or an air heater as taught by Kuroda in order to recover the heat from the treated flue gas and preheat the combustion air for such as the boiler.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (JP '324 in view of Herr '241) as applied to claim 1 above, and further in view of Dunn Jr. et al. (5,423,272). The applied references fail to disclose the device is connected from a fossil-fuel fired steam generator in a power plant. Dunn teaches it is conventional to provide flue gas cleaning device (SCR) downstream of a fossil fuel-fired power generation system to remove the NOx from flue gas stream (Col. 2, lines 27-60). Thus, it would have been obvious in view of Dunn to one having ordinary skill in the art to incorporate the device of the applied references in the fossil fuel-fired power generation system as taught by Dunn in order to purify the flue gas.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 5,043,146 discloses conventional grid type rectifier to prevent stagnating and swirling of the flue gas.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong
July 15, 2004
TD

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700